

Before the
FEDERAL COMMUNICATIONS COMMISSION
 Washington, D. C. 20554

NOV - 8 1993FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of

Amendment of the Commission's
 Rules to Establish New Personal
 Communications Services

GEN Docket No. 90-314
 ET Docket No. 92-100

To: The Commission

COMMENTS

Alcatel Network Systems, Inc. ("ANS"), by its attorney, hereby comments on an Emergency Petition ("Petition") in the above-captioned proceeding, filed September 13, 1993, by Apple Computer, Inc. ("Apple").¹

In its Petition, Apple requests adoption of various measures to facilitate implementation of "nomadic" Data-PCS. Apple proposes allocating the 1910-1930 MHz band exclusively for Data-PCS. It also proposes reserving two or more 10 MHz channels in the 1850-1990 MHz band for at least five years to accommodate microwave incumbents which have "retuned" their systems for use in this band pending possible relocation to bands above 3 GHz.

As demonstrated herein, ANS, a leading microwave manufacturer,² has serious concerns

¹In an October 22, 1993, Public Notice (DA 93-1278), the Commission invited comments on November 8, 1993, in response to the Petition.

²ANS played a leading role in development of the rules governing microwave operation in the bands above 3 GHz by filing the rulemaking petition which initiated that proceeding and by proposing a compromise plan that facilitated ultimate adoption of the rules. It is a wholly-owned subsidiary of Alcatel Alsthom ("Alcatel"), one of the world's largest corporations (with annual sales in excess of \$30 billion) and the world's largest manufacturer and supplier of telecommunications equipment. In particular, Alcatel is the world's largest independent manufacturer and supplier of microwave radios. Formerly Collins Radio and Rockwell International, ANS, with over \$500 million in annual sales, is a world leader in manufacturing microwave and light wave transmission systems. ANS' equipment is used for a wide range of services, including short, medium and long-haul voice, video and data transmissions. Its microwave customers include all the BOCs, most major independent telephone companies, cellular operators, power and other utility companies, oil companies, railroads, industrial companies, and state and local government.

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about the efficacy of Apple's proposal. Retuning is too complex, disruptive to microwave operations, and costly. Microwave equipment needed for retuning generally is unavailable. There is no evidence in the record that retuning would be less expensive than relocation, that it is technically feasible, or that it would not adversely affect other microwave operations in the 2 GHz band. Thus, at a minimum, the Commission must not adopt Apple's Petition until such documentation is submitted and until Apple proves its claims.

APPLE'S PROPOSAL

Given the nomadic character of Data-PCS and the attendant difficulties in coordinating these devices with incumbent microwave users, Apple recognizes that any band allocated for unlicensed PCS devices must be cleared totally of microwave users first.³ As Apple states in its companion Petition for Reconsideration of the Third Report and Order and Memorandum Opinion and Order in ET Docket No. 92-9:⁴

Given the operating characteristics of Data-PCS devices and the sensitivity of microwave receivers to interference, coexistence between Data-PCS and microwave operations is impossible. Data-PCS devices will interfere with microwave receivers. As a result, Data-PCS devices cannot be deployed until incumbent microwave stations have been relocated from frequencies used for Data-PCS.

* * * * *

The nomadic nature of Data-PCS devices makes this an especially daunting task. Because such devices can be operated anywhere within the United States, it will not be possible to begin service incrementally by clearing spectrum on a regional basis. Moreover, since Data-PCS does not rely on base stations or other fixed infrastructure, Data-PCS devices cannot be deployed prior to band clearing using frequency coordination in particular markets. Thus, the first Data-PCS device

agencies.

³Petition at 5.

⁴Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, Third Report and Order and Memorandum Opinion and Order, 8 FCC Rod 6589 (1993) ("Third Report and Order").

cannot be placed into use until the "last link" has been moved from the affected frequencies.⁵

To expedite this process, Apple proposes adoption of what it calls a "restriping" or "retuning" of the PCS band. This frequency re-engineering

may involve changing, or retuning, the operating channel of any or all paths of a particular link. There can be many reasons for frequency re-engineering, some of which involve the concerns of a single operator, and others which reflect the need to make space for new links.⁶

Supplementing this frequency retuning is Apple's request to set aside reserve channels for the re-tuned microwave users:

In particular, the Commission should set aside two or more 10 MHz reserve channels at 2 GHz for a five-year period to facilitate the introduction of both licensed and unlicensed PCS in the face of incumbent microwave stations' co-primary status. The need for such reserve channels goes beyond the band-clearing needs of those deploying nomadic devices. Both licensed PCS and non-nomadic unlicensed interests have found that they will need to employ a range of techniques, singly and in combination and including "frequency re-engineering," to address the problem of co-primary microwave incumbency.⁷

Apple claims that this approach would "maintain as much flexibility as possible to employ co-channel and adjacent channel interference-avoidance techniques between microwave incumbents and PCS users . . . that can be used to accommodate the in-band relocation of certain microwave stations."⁸ Moreover, Apple asserts that encouragement of in-band retuning

would provide significant returns by increasing the value of PCS licenses at auction, limiting the number of conflicts in which the FCC must become involved, and relieving spectrum congestion. In addition, in-band retuning could well eliminate the need for larger-than necessary spectrum PCS allocations intended to deal with in-band interference. Retuning also would benefit microwave incumbents by enabling some to stay in the 2 GHz band for a significant period and by minimizing the disruption and possible system reliability problems

⁵Petition for Reconsideration at 2.

⁶Petition at 8 n.20.

⁷Petition at 8 (footnotes omitted).

⁸Petition at 9.

associated with relocation to 6 GHz frequencies. Retuning also would reduce the likelihood of interference from deployment of both licensed and unlicensed PCS facilities, which plan to rely on various avoidance schemes to minimize interference.⁹

Not only does Apple claim its retuning proposal would facilitate introduction of unlicensed PCS, it also claims that this approach would not burden microwave incumbents. It asserts that "there is no risk presented by retuning caused by major changes in propagation characteristics, comparable to the uncertainties exposed by a major frequency relocation, and thereby the reliability of the path need not be an additional consideration."¹⁰ In addition, Apple proposes that retuning only would be applied "when it represents the best available option, upon consideration of the many mechanical, logistical, and financial concerns involved in frequency-reengineering a path."¹¹ Finally, Apple estimates that retuning would cost approximately \$15,000 per station, while relocation would cost approximately \$250,000 per station.¹²

RETUNING WOULD BURDEN MICROWAVE INCUMBENTS

Adoption of Apple's retuning proposal, as a frequency management tool to facilitate introduction of unlicensed PCS, is highly questionable. In the Third Report and Order, the Commission recognizes the problems associated with the retuning approach:

We do not believe this approach is feasible for . . . fixed microwave facilities, since in most cases the incumbent licensee could ultimately be required to move to another band. Any intervening relocation would increase the overall cost to relocating the incumbent fixed microwave facilities; it would increase the cost of licensed emerging technology providers by increasing the number of fixed microwave facilities that they may have to pay to relocate; and it would burden incumbents with two relocations instead of one.¹³

⁹Petition for Reconsideration at 4-5.

¹⁰Petition for Reconsideration at 8.

¹¹Petition for Reconsideration at 8.

¹²Petition for Reconsideration at 7 n.13.

¹³Third Report and Order, 8 FCC Red at 6600-6601.

Based upon its extensive experience in manufacturing and installing microwave facilities, ANS totally agrees with the Commission's assessment. Contrary to Apple's claims, retuning would threaten the integrity of microwave incumbents, which already face the spectre of relocation to different bands.

As a threshold matter, ANS agrees with Apple's characterization of the problems associated with introducing Data-PCS and other unlicensed PCS devices. Co-existence between Data-PCS and microwave operations is impossible. Consequently, all incumbent microwave stations must be cleared from the band of frequencies used for Data-PCS before initiating service.¹⁴

Even though ANS does not dispute the fact that adequate frequencies may exist in the 2 GHz bands to retune existing microwave users, it has considerable reservations regarding the cost and disruption to microwave users if this proposal is implemented. It is impossible to understand or even assess the basis of Apple's claims. Apple has not presented its proposal to any industry organization (i.e., TIA's fixed point-to-point microwave section or UTAM).

A. Fixed Microwave Operations Are Not Readily Susceptible to Retuning.

To comprehend the impact of Apple's proposal on microwave systems, the basic configuration of a microwave radio must be understood. A fixed point-to-point microwave radio is a combination of several separate modules interconnected by cables and connectors to perform complex functions. These functions include integrating orderwire, alarm, and baseband functions into a composite signal, which is then modulated onto a radio frequency carrier. Frequency sensitive modules then translate the composite modulated signal to microwave radio frequencies. At the receive end, this signal is translated back to a lower frequency and the processes are reversed.

¹⁴See also Third Report and Order, 8 FCC Rod at 6596.

The module needed to perform this process is a metal box containing connectors and many frequency sensitive components. Each module only can cover a portion of the 2 GHz band. Consequently, a different module (containing similar, but slightly different frequency selective components) is needed for each different operating frequency.

At least five modules would be affected by any proposed retuning. These modules include the transmit and receive local oscillators, the up and down converters, and most importantly, the RF filter. Virtually all 2 GHz radios are "hot standby."¹⁸ The RF filter must be retuned or replaced if retuning is to occur.

B. Retuning is Highly Risky for Microwave Radios.

Contrary to Apple's claim that retuning is preferable to relocation, retuning invariably is more traumatic and risky to the user. If 2 GHz users are relocated to higher bands, the new facility may be installed and tested in parallel with an existing network. When it is accepted, the traffic can be cut to the new facility in a matter of seconds per circuit with only minimal service disruption.

For retuning, the procedure is much more complex. First, the RF filter must be removed. This unquestionably will disrupt traffic. The radio will remain unusable during the time it takes to retune or replace ALL radio components of at least one of the hot standby radio pairs. The time involved is not only what is needed to replace/retune the modules but also what is needed to run end-to-end tests to readjust the components, determine compliance with Commission rules and regulations, and verify the integrity of the circuit.

Since many radio systems employ repeaters with no baseband connection, this procedure must be done at several sites before the circuit can be reestablished for any useful purpose. In short, all radios, to be retuned, must be taken out of service for at least a significant portion of

¹⁸This radio configuration combines the transmit and receive functions by the use of a combining network containing the RF filter.

an hour to several days before the system is usable again. Given the public interest nature of the services involved (e.g., utilities), such disruption is untenable, especially since, as detailed below, redundancy is difficult to establish.

If any of the retuned components fail, the system must be reconfigured to its original configuration until new components can be obtained. Unfortunately, if any of the RF combining circuitry is damaged during the process (a distinct possibility), the system will be out of service until new parts are available (if they can, in fact, be obtained).

Since the retuning procedure must take the existing system out of service, most users will demand that existing traffic be cut over to alternate facilities until the existing facilities are reestablished. It is not easy to establish alternate transmission paths between existing radio terminals. Many radio systems have sites in locations with no existing alternate telecommunications facilities. Many do not even have a common telephone or a convenient way to get one. If a system operator is fortunate enough to be located in an urban area served by a common carrier, alternate facilities are available but at a substantial price, which varies depending upon circuit length and the carrier used.¹⁸

If radios are to be retuned to a new frequency more than a nominal frequency difference away from the existing frequency, new modules are required. For radios more than a few years old, these modules either will be unavailable or will be significantly more expensive than similar

¹⁸For example, in the Dallas-Fort Worth area, a single DS-1 24 channel capability circuit rents for about \$800/month. The user, however, also must pay for whatever costs are required to establish a circuit to the carrier's "point of presence." For a typical 300 channel user, this cost would be \$10,000. Circuit initiation and channel bank costs are extra.

modules for current production equipment.¹⁷ Indeed, retuned modules could exceed the cost of even new current production radios.

Apple greatly understates both the risk and the cost of retuning existing radios (in service). Apple's estimated cost of \$15,000 to retune each radio is not supported by any other source. Nor has Apple validated its estimates or approach with any industry organization.

CONCLUSION

While ANS appreciates Apple's efforts to establish procedures for facilitating introduction of unlicensed PCS, approval of retuning is premature. A comprehensive analysis of the actual impact upon microwave users, which already are being moved to clear spectrum for PCS, the technical feasibility of retuning, and its costs must be completed before any retuning proposal is approved.

Respectfully submitted,

ALCATEL NETWORK SYSTEMS, INC.



Robert J. Miller
Gardere & Wynne, L.L.P.
1601 Elm Street, Suite 3000
Dallas, Texas 75201

Dated: November 8, 1993

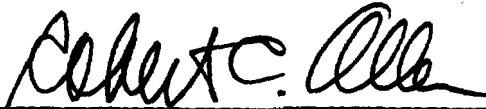
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¹⁷For example, ANS has not produced analog radios for more than eight years. Although it repairs these units (replacement of ICs and other small components), it is virtually impossible to build new units (requiring obsolete connectors, printed circuit boards, and metal fabrication parts). Instead, ANS' factories now are equipped for surface mount technology and these old products are manufactured through hole technology, which no longer can be produced in any measurable quantity. Other vendors may produce older technology products, but the inherent costs of reinitiating limited production of older products unquestionably will make these modules quite expensive.

GERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing Comments on Emergency Petition will be delivered by hand to counsel for Apple Computer, Inc., Henry Goldberg, Esq., Goldberg, Godles, Wiener & Wright, 1229 19th Street, N.W., Washington, D.C. 20036, on the 8th day of November, 1993.



Robert C. Allen

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